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Laser prototyping of polymer-based nanoplasmonic components

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Abstract

Growing interest in the field of surface plasmon polaritons comes from a rapid advance of nanostructuring technologies. The application of two-photon polymerization by pulse laser technique for the fabrication of dielectric and metallic SPP-structures, which can be used for localization, guiding, and manipulation of plasmonic waves on a subwavelength scale, are studied. This fast technology is based on nonlinear absorption of near-infrared femtosecond laser pulses. Excitation, propagation, and interaction of SPP waves with nanostructures are controlled and studied by leakage radiation imaging. It is demonstrated that created nanostructures are very efficient for the excitation and focusing of plasmonic waves on the metal film. Examples of various plasmonic components are presented and discussed.